

NON-PUBLIC?: N
ACCESSION #: 9302220254
LICENSEE EVENT REPORT (LER)

FACILITY NAME: SEABROOK STATION PAGE: 1 OF 3

DOCKET NUMBER: 05000443

TITLE: AUTOMATIC REACTOR TRIP DUE TO A PHASE TO GROUND FAULT
ON

THE 25 KV SYSTEM

EVENT DATE: 01/14/93 LER #: 93-003-00 REPORT DATE: 02/12/93

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Mr. James M. Peschel, Regulatory TELEPHONE: (603) 474-9521
Compliance Manager extension 3772

COMPONENT FAILURE DESCRIPTION:

CAUSE: B SYSTEM: EL COMPONENT: UDMP MANUFACTURER: P295
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On January 14, 1993, at 2019, an automatic reactor trip from 100 percent power occurred. This reactor trip followed a turbine trip caused by a phase to ground fault on the 25 kV main generator isolated phase bus (EL). This event was reported to the NRC at 2135 as an immediate notification pursuant to 10CFR50.72(b)(2)(ii), automatic actuation of the Reactor Protection System (RPS) and Engineered Safety Feature (ESF) System.

The 25 kV main generator isolated phase bus connects the output of the main generator to the three phase transformer used to step up the 25 kV generator output to the 345 kV grid voltage. Each air-insulated phase of the bus is surrounded by a duct assembly that isolates it from the other phases and the surrounding area. The bus conductors are cooled by a bus

cooling unit that includes redundant fans and associated backdraft dampers downstream of the fans. A phase to ground fault occurred when a blade from the damper for the running fan became detached from the damper frame and was carried in the air stream, eventually making contact with the bus and a section of air duct.

There were no adverse safety consequences as a result of this event. The plant response to the trip was normal, and all operator actions were determined to be correct.

The damper blade failure was attributed to an inadequate damper blade pivot pin design by the vendor who supplied the bus duct cooling fan units. Corrective action was to redesign the damper assemblies to reduce the possibility of blade failure and to add a heavy debris screen downstream of the damper to prevent migration of loose parts if a future damper failure should occur.

END OF ABSTRACT

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Description of Event

On January 14, 1993, at 2019, an automatic reactor trip occurred from 100 percent power. This reactor trip was initiated when the main generator ground fault protective relays actuated, resulting in the opening of the main generator circuit breaker and a turbine trip. The turbine trip initiated a reactor trip consistent with plant design. The reason for the ground fault protective relay actuation was a phase to ground fault in the 'B' phase of the 25 kV isolated phase bus.

Electrical power leaves the Seabrook Station main generator via the isolated phase bus. This bus consists of one conductor for each phase of the main generator output, with each conductor totally enclosed in an aluminum duct assembly. This duct isolates the individual phases from one another and from the environment. The bus conductors are air cooled by a bus cooling unit that consists of redundant fans and an air-to-water heat exchanger. Cooling air is supplied directly to the B phase of the isolated phase bus by either of the two cooling fans. Downstream of each fan is a backdraft damper that prevents reverse air flow through the idle fan. On January 14, 1993 a plastic damper blade shaft pivot pin failed and allowed a blade to break free of the damper frame. The blade was carried in the air stream from the fan until it made contact with the B phase conductor and the duct assembly. In response to the contact, the main generator ground fault protective relays actuated to protect the generator stator, opening the generator output breaker and resulting in a turbine trip. This

turbine trip generated the Reactor Protection System (RPS) trip signal that initiated the automatic reactor trip.

The response to the reactor trip and the subsequent recovery actions by plant operators were determined to be correct. Primary plant system response was normal with expected Engineered Safety Feature (ESF) actuations (Emergency Feedwater System BA! actuation on Steam Generator LO-LO level and Feedwater System SJ! Isolation in response to the reactor trip).

At 2135 EDT on January 14, 1993 North Atlantic made a four-hour notification to the NRC pursuant to 10CFR50.72(b)(2)(ii) since this event resulted in an RPS and an ESF actuation.

Safety Consequences

There were no adverse safety consequences as a result of this event. Plant equipment functioned as designed and operator actions were determined to be correct. At no time during the event was there any impact on the health and safety of plant employees or the public.

Root Cause

The root cause of this event was determined to be an inadequate damper blade pivot pin design by the vendor who originally supplied the bus duct cooling fan units.

Corrective Actions

The backdraft dampers downstream of the isolated phase bus duct cooling fans were modified to strengthen the damper frames, replace the original plastic damper blade pivot pins with carbon steel pins, and replace the blade linkage assemblies with a significantly stronger linkage. In addition, a heavy debris screen has been added downstream of the dampers to prevent any loose damper components from being carried in the airstream to the isolated phase bus in the event a future damper failure occurred.

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North Atlantic will evaluate the need to replace the modified dampers with dampers specifically designed for high air flow, to periodically inspect these dampers, and to install inspection ports in the bus duct to facilitate periodic damper inspection. This evaluation is expected to be completed by September 15, 1993.

Plant Conditions

At the time of this event, the plant was in MODE 1, at 100 percent power, with a Reactor Coolant System temperature of 587.5 degrees Fahrenheit and a pressure of 2235 psig.

Related Events

This is the third event at Seabrook Station where mechanical failure of a component in a support system caused a reactor trip.

LER 90-018-00 reported a reactor trip caused by excessive vibration of the Electrohydraulic Control pressure switches, which was due to an unsatisfactory location of these pressure switches during plant design.

LER 90-025-00 reported a reactor trip caused by fatigue failure of a control air pipe nipple, which was due to an inadequate location of the air booster relay.

However, neither of these events is similar to the event reported in this LER, which was due to an inadequate vendor design of an integral component which could not be inspected once the equipment was delivered without major equipment removal. The corrective actions for LERs 90-018-00 and 90-025-00 would not have prevented this event.

ATTACHMENT 1 TO 9302220254 PAGE 1 OF 2

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Ted C. Feigenbaum
Senior Vice President and
Chief Nuclear Officer

NYN- 93026

February 12, 1993

United States Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Reference: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: Licensee Event Report (LER) No. 93-003-00: Automatic
Reactor Trip Due to a Phase to Ground Fault on the 25kV
System

Gentlemen:

Enclosed please find Licensee Event Report (LER) No. 93-003-00 for
Seabrook Station. This submittal documents a Reactor Trip and Engineered
Safety Feature actuation which occurred on January 14, 1993. This event
is being reported pursuant to 10 CFR 50.73(a)(2)(iv). This event was
previously reported by North Atlantic as a non-emergency four hour report
pursuant to 10 CFR 50.72(b)(2)(ii) on January 14, 1993.

Should you require further information regarding this matter, please
contact Mr. James M. Peschel, Regulatory Compliance Manager, at (603)
474-9521, extension 3772.

Very truly yours,

Ted C. Feigenbaum
TCF:MJM/act

Enclosures: NRC Forms 366, 366A

a member of the Northeast Utilities system

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United States Nuclear Regulatory Commission February 12, 1993
Attention: Document Control Desk Page two

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